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## CELLPHONE BASED WATER/IRRIGATION PUMP REMOTE CONTROLLER CIRCUIT

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### ABSTRACT

The Cell-phone Based Water Pump Remote Controller Circuit is a cost-effective and efficient solution designed to remotely operate a water pump using simple mobile communication technology. In many rural and agricultural regions, farmers face challenges in manually controlling irrigation pumps due to long distances, irregular power supply, and labour shortages. This project eliminates the need for physical presence by enabling pump operation through a cell-phone interface. The system utilizes Dual Tone Multi-Frequency (DTMF) signals generated by pressing keys on a mobile phone, which are decoded by a DTMF decoder circuit. The decoded signals are processed through a monostable multivibrator to produce pulses, which in turn drive a relay mechanism connected to the water pump. This allows the user to switch the pump ON or OFF reliably and safely. The proposed system offers several advantages including low cost, ease of use, and wide accessibility, since it can function with any basic mobile phone without the need for internet connectivity. The design is particularly suitable for farmers, households, and industries where pumps are installed at remote or hard-to-reach locations. This project demonstrates the practical application of telecommunication and electronics in addressing real-life agricultural and water management challenges.

**KEYWORDS:** DTMF technology, Remote pump control, Relay switching, Irrigation Automation, Audio tone processing, Low-cost embedded system.

## **1.INTRODUCTION**

Cell-phone based water-pump remote controllers let farmers operate irrigation pumps from anywhere using a simple phone call. The design uses DTMF (Dual Tone Multi-Frequency) signalling, when a farmer calls the SIM phone attached to the controller and presses a keypad key, the DTMF tone is decoded and used to trigger a timed relay that switches the pump on for a preset duration. This approach requires no internet and works with feature phones, making it low-cost and highly practical for rural irrigation. The project aims to remotely control the switching on and off of pump motors both in star-delta mode and DOL mode using DTMF technology in a very cost-effective way. It is mainly aimed towards solving the problems of farmers who need to stay in the fields for long durations just to switch on/off the pumps. This project provides a simple, low-cost solution for farmers to remotely control irrigation pump motors without relying on the internet. The system makes use of DTMF (Dual Tone Multi-Frequency) signalling, which is available in any standard mobile or landline phone.

## **2.Problem Statement and Literature Review**

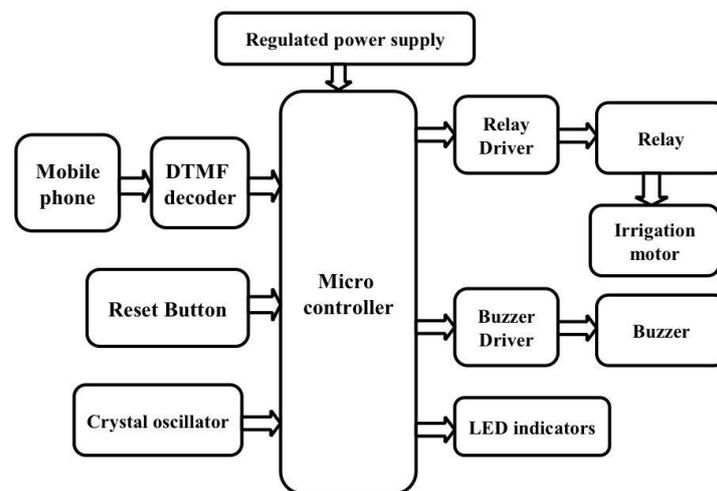
Farmers and households face difficulty in operating water pumps located in distant or hard-to reach areas, leading to time loss, effort, and water wastage. Hence we are proposing a low cost and reliable remote-control system to provide convenient operation and efficient resource management. The integration of telecommunications and agriculture has been an active area of research and practical innovation for over two decades. One of the most significant challenges faced by farmers, especially in rural areas, is the manual operation of irrigation pumps, which often requires them to travel long distances to switch pumps on or off. To address this issue, researchers and developers have explored cell-phone based water pump remote controller systems, which use existing mobile networks to remotely operate irrigation equipment without requiring internet connectivity. Early work in this field focused on Dual Tone Multi-Frequency (DTMF) based control systems. DTMF is a signalling system used in telephone networks where pressing a key on a phone generates two distinct tones corresponding to the row and column of the keypad. Electronics hobbyists and researchers recognized the reliability of DTMF for simple control applications. Circuits using the MT8870 DTMF decoder IC became popular, as the chip directly converts received tone pairs into a 4-bit digital output.

### 3. Working Principle

The system operates by using a standard GSM (Global System for Mobile) or DTMF (Dual-Tone Multi-Frequency)–based control method to switch the irrigation pump ON or OFF through a cell-phone call.

1. User Command: The farmer or user calls or sends an SMS from any mobile phone to the SIM card inserted in the controller unit located at the field.
2. Signal Reception & Decoding: The GSM module (or a DTMF decoder if using call tones) receives the incoming signal and sends it to a microcontroller
3. Controller Logic: The microcontroller verifies the caller ID or message content for authorization and interprets the command (“START” or “STOP”).

### 4. Methodology



**Cell-phone for Circuit:** A mobile phone is connected to the circuit, either through its audio jack or by keeping it near a hands-free kit or headset.

**DTMF Decoder:** The DTMF tones generated by the cell-phone are decoded using a DTMF decoder IC (commonly MT8870).

**Relay and Motor Pump:** The relay acts as an electronic switch to control the pump motor.

**Microcontroller:** The proposed system makes use of the PIC microcontroller from Microchip.

**LM7805 Voltage Regulator:** The primary role of the LM7805 is to provide a stable, fixed output voltage of +5 volts (V).

### 5. RESULT

The project “GSM based Irrigation Water Pump Controller with feedback” was designed to

operate an irrigation motor using a mobile phone. The switching mechanism can be done from anywhere in the world. The response time was immediate, and the control worked smoothly from any distance, as long as mobile network coverage was available. The system functioned consistently without false triggering or noise interference. This project eliminates the manual switching mechanism used by the farmers to ON/OFF the irrigation system. This confirms that the project meets all its objectives — providing a safe, efficient, and convenient method for remotely operating a water pump using a standard mobile phone. The final result proves that DTMF-based remote control is a practical and reliable solution for real-life applications in agriculture, households, and industry.

## **6. CONCLUSION**

In this project, we successfully demonstrated how a simple mobile phone can be used as an effective remote control system for operating a water pump from any location. By using DTMF-based technology, we were able to convert ordinary keypad tones into electrical control signals that operate the pump through a relay. This removes the need for physical presence near the pump switch, which is especially helpful in places like farms, borewells, and rooftops where reaching the pump is often time-consuming, inconvenient, or unsafe. The system is cost-effective, easy to install, and does not require internet or complex wireless modules. It works purely on mobile communication, which is available almost everywhere. This makes the design practical even in remote rural areas. The project also demonstrates how electronics and communication engineering concepts like signal decoding, microcontroller processing, and relay control can come together to create a simple but powerful real-world application. Overall, this project highlights how technology can reduce manual effort, improve safety, and make daily tasks more convenient. It also shows the potential of DTMF-based control systems for automating various electrical appliances. With further improvements like adding feedback messages, security codes, or sensor-based automation, this system can become an even more advanced and reliable solution. This project has not only proven the practical usefulness of a mobile-controlled pump system but also strengthened our understanding of embedded systems, communication techniques, and hardware integration. It stands as a clear example of how engineering knowledge can be applied to solve real-life problems effectively and efficiently.

## **7. APPLICATIONS**

Irrigation pump control – Farmers can remotely switch ON/OFF borewell or submersible

pumps used for irrigating fields, saving time and labour.

- Agricultural Fields – Farmers can remotely control irrigation pumps installed in their farms by just giving a phone call, saving time and effort.
- Domestic Water Supply – Useful for operating pumps that fill overhead tanks or pump water from underground sumps in houses and apartments.
- Rural Areas – In villages where pumps are located far from homes, users can easily switch ON/OFF pumps without traveling long distances.

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